Amendments to the claims

Please amend the claims as follows:

Please cancel 205 to 206, without prejudice or disclaimer.

This listing of claims will replace all prior versions, and listing, of claims in the application:

Listing of Claims:

Claims 1 to 30 (canceled)

Claim 31 (currently amended): A method of producing a polypeptide polymer comprising the steps of:

(a) providing a plurality of monomeric polypeptides and at least one divalent cation or at least one template molecule, wherein the monomer polypeptides are capable of self assembly in the presence of a divalent cation or at least one template molecule; and

(b) (i) polymerizing the monomeric polypeptides through a self assembly process in the presence of the at least one divalent cation, or, (ii) polymerizing the monomeric polypeptides in the presence of the at least one **[[**a**]]** template molecule, under conditions wherein the monomeric polypeptides self assemble, thereby producing a polypeptide polymer,

wherein each monomeric polypeptide of the plurality of monomeric polypeptides have either (a) an amino acid sequence as set forth in SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, or SEQ ID NO:10, or, (b) an amino acid sequence as set forth in SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, or SEQ ID NO:10, and having at least one conservative substitution,

and at least one monomeric polypeptide of the plurality of monomeric polypeptides includes a modification comprising attachment of a ~~non-monomeric~~ polypeptide.

Claim 32 to 33 (canceled)

34. (previously presented): The method of claim 31, wherein at least one of the plurality of monomeric polypeptides is made by a method comprising the steps of:

preparing a vector comprising a nucleic acid, wherein the nucleic acid encodes the monomeric polypeptide;

inserting the vector into a host cell;

growing the host cell in a suitable culture to express the nucleic acid to form the polypeptide; and

isolating the formed monomeric polypeptide from the host cell.

35. (previously presented): The method of claim 31, wherein the step of polymerizing the monomeric polypeptides further comprises the steps of:

dissolving the plurality of monomeric polypeptides in a solution; and

adding a template molecule and an alkaline earth metal ion to the solution.

Claim 36 to 113 (canceled)

114. (previously presented): The method of claim 211, wherein the vector is selected from the group consisting of viral vectors, plasmid vectors, phage vectors, phagemid vectors, cosmids, fosmids, bacteriophages, artificial chromosomes, adenovirus vectors, retroviral vectors, and adeno associated vectors.

115. (previously presented): The method of claim 34, wherein the host is selected from the group consisting of prokaryotes, eukaryotes, funguses, yeasts, plants and metabolically rich hosts.

Claims 116 to 131 (canceled)

132. (previously presented): The method of claim 31, wherein the monomeric polypeptides have a molecular weight of more than 5,000 daltons.

133. (previously presented): The method of claim 132, wherein the monomeric polypeptides have a molecular weight of more than 10,000 daltons.

134. (previously presented): The method of claim 31, wherein the monomeric polypeptides polymerize to form a hollow tube, a tubule, a micelle or a molecular sieve.

135. (previously presented): The method of claim 134, wherein the hollow tube has approximately a 25 nm outer diameter and a 20 nm inner diameter.

136. (previously presented): The method of claim 31, wherein the monomeric polypeptides are polymerized in the presence of a divalent cation and a template molecule.

137. (previously presented): The method of claim 31, wherein the template molecule comprises a plasmid, a phage, a cosmid, a phagemid, a virus or a portion of a virus.

138. (previously presented): The method of claim 137, wherein the virus comprises a retrovirus, a parainfluenzavirus, a herpesvirus, a reovirus or a paramyxovirus.

139. (previously presented): The method of claim 137, wherein the portion of a virus comprises a coat protein, a spike glycoprotein or a capsid protein.

140. (previously presented): The method of claim 31, wherein the plurality of monomeric polypeptides are polymerized in the presence of at least one divalent cation selected from the group consisting of Ca2+, Mg2+, Cu2+, Zn2+, Sr2+, Ni2+, Mn2+ and Fe2+.

141. (previously presented): The method of claim 31, wherein the plurality of monomeric polypeptides are polymerized in the presence of Ca2+ and Mg2+.

142. (previously presented): The method of claim 31, wherein the step of polymerizing the monomeric polypeptides further comprises the step of dissolving the monomeric polypeptides in an aqueous solution.

143. (previously presented): The method of claim 31, wherein the template molecule is prepared by fragmenting or shearing of a suspension of a polymer.

144. (previously presented): The method of claim 31, wherein the monomeric polypeptides interact with each other by pairing, bundling, entangling or electrostatic cross linking,

thereby generating paired polymers, bundled polymers, entangled polymers, cross linked polymers or an interconnected network of polymers.

145. (previously presented): The method of claim 31, further comprising providing a therapeutic agent or a drug molecule and adding the therapeutic agent or drug molecule to the polymerization step, thereby generating a therapeutic agent or drug molecule encapsulated by the polymers.

146. (previously presented): The method of claim 145, wherein the therapeutic agent or drug molecule is added to the polymerization step.

147. (previously presented): The method of claim 146, further comprising capping the partially formed polymer using a capping unit.

148. (previously presented): The method of claim 147, wherein the capping unit comprises a polypeptide monomer.

149. (previously presented): The method of claim 146, wherein the therapeutic agent or drug encapsulating step is carried out by mixing the polymer and the therapeutic agent or drug molecule together in a solution such that the therapeutic agent or drug molecule can permeate inside the polymer.

150. (previously presented): The method of claim 145, further comprising attaching a targeting molecule, or an additional targeting molecule if a targeting molecule is already present, or a vector, or an additional vector if a vector is already present, to the therapeutic agent or drug-loaded polymer during the encapsulation process or after the completion of the encapsulation process.

151. (previously presented): The method of claim 145, further comprising using lipids or lipid molecules during the encapsulation process.

152. (previously presented): The method of claim 31, further comprising attaching the polymer to a hydrogel.

153. (previously presented): The method of claim 152, wherein the hydrogel comprises a three dimensional structural network for a biochip.

154. (previously presented): The method of claim 31, wherein the monomeric polypeptide has an amino acid sequence as set forth in SEQ ID NO:2.

Claims 155 to 188 (canceled)

189. (previously presented): The method of claim 31, wherein the conservative amino acid substitution comprises substituting one amino acid for another of the same class.

190. (previously presented): The method of claim 189, wherein the conservative amino acid substitution comprises substitution of one hydrophobic amino acid for another, or substitution of one polar amino acid for another.

191. (previously presented): The method of claim 190, wherein the conservative amino acid substitution comprises substitution of isoleucine, valine, leucine or methionine, for another hydrophobic amino acid.

192. (previously presented): The method of claim 190, wherein the conservative amino acid substitution comprises substitution of arginine for lysine, glutamic acid for aspartic acid or glutamine for asparagine.

193. (previously presented): The method of claim 31, wherein the polypeptide polymer is a nanoscale drug delivery vehicle.

194. (previously presented): The method of claim 31, wherein the polymer or at least one monomeric polypeptide further comprises an enzyme.

195. (previously presented): The method of claim 31, wherein the polymer or at least one monomeric polypeptide further comprises a nucleotide or a nucleotide derivative.

196. (previously presented): The method of claim 31, wherein the polymer or at least one monomeric polypeptide further comprises a lipid or a lipid derivative.

197. (previously presented): The method of claim 31, wherein the polymer or at least one monomeric polypeptide further comprises a vector or a targeting molecule.

198. (previously presented): The method of claim 197, wherein the vector or targeting molecule comprises an antibody.

199. (previously presented): The method of claim 197, wherein the vector or targeting molecule comprises an oligosaccharide.

200. (previously presented): The method of claim 197, wherein the vector or targeting molecule comprises a Morphatide™.

201. (previously presented): The method of claim 211, wherein the vector is a targeting vector.

Claim 202 (currently amended): The method of claim 31, wherein the ~~polymer or~~ attached ~~at least one non-monomeric~~ polypeptide is ~~further comprises~~ an enzyme, an antibody or a targeting molecule, or ~~at least one non-monomeric~~ the polymer polypeptide further comprises a modification comprising an enzyme, an antibody or a targeting molecule.

Claim 203 (currently amended): The method of claim 31, wherein the ~~polymer or~~ attached ~~at least one non-monomeric~~ polypeptide comprises a charged group.

Claim 204 (currently amended): The method of claim 31, wherein the attached ~~non-monomeric~~ polypeptide is attached to a monomeric protein as a recombinant fusion protein.

Claims 205 to 206 (canceled)

Claim 207 (previously presented): A method of producing a polypeptide polymer comprising the steps of:

(a) providing a plurality of monomeric polypeptides and at least one divalent cation, wherein the monomer polypeptides are capable of self assembly in the presence of a divalent cation; and

(b) (i) polymerizing the monomeric polypeptides through a self assembly process in the presence of at least one divalent cation, or, (ii) polymerizing the monomeric polypeptides in the presence of a template molecule, under conditions wherein the monomeric polypeptides self assemble, thereby producing a polypeptide polymer,

wherein each monomeric polypeptide of the plurality of monomeric polypeptides have either (a) an amino acid sequence as set forth in SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, or SEQ ID NO:10, or, (b) an amino acid sequence as set forth in SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, or SEQ ID NO:10, having at least one conservative substitution,

and at least one monomeric polypeptide of the plurality of monomeric polypeptides includes a modification comprising attachment of a nucleotide or attachment of a nucleotide derivative.

208. (previously presented): A method of producing a polypeptide polymer comprising the steps of:

(a) providing a plurality of monomeric polypeptides and at least one divalent cation, wherein the monomer polypeptides are capable of self assembly in the presence of a divalent cation; and

(b) (i) polymerizing the monomeric polypeptides through a self assembly process in the presence of at least one divalent cation, or, (ii) polymerizing the monomeric polypeptides in the presence of a template molecule, under conditions wherein the monomeric polypeptides self assemble, thereby producing a polypeptide polymer,

wherein each monomeric polypeptide of the plurality of monomeric polypeptides have either (a) an amino acid sequence as set forth in SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, or SEQ ID NO:10, or, (b) an amino acid sequence as set forth in SEQ ID NO:2, SEQ ID

NO:4, SEQ ID NO:6, SEQ ID NO:8, or SEQ ID NO:10, having at least one conservative substitution,

and at least one monomeric polypeptide of the plurality of monomeric polypeptides is modified by attachment of a lipid or attachment of a lipid derivative.

209. (previously presented): The method of claim 208, wherein the lipid comprises a polyethylene glycol.

210. (previously presented): A method of producing a polypeptide polymer comprising the steps of:

(a) providing a plurality of monomeric polypeptides and at least one divalent cation, wherein the monomer polypeptides are capable of self assembly in the presence of a divalent cation; and

(b) (i) polymerizing the monomeric polypeptides through a self assembly process in the presence of at least one divalent cation, or, (ii) polymerizing the monomeric polypeptides in the presence of a template molecule, under conditions wherein the monomeric polypeptides self assemble, thereby producing a polypeptide polymer,

wherein each monomeric polypeptide of the plurality of monomeric polypeptides have either (a) an amino acid sequence as set forth in SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, or SEQ ID NO:10, or, (b) an amino acid sequence as set forth in SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, or SEQ ID NO:10, having at least one conservative substitution,

and at least one monomeric polypeptide of the plurality of monomeric polypeptides is modified by attachment of a nucleic acid.

211. (previously presented): The method of claim 210, wherein at least one monomeric polypeptide of the plurality of monomeric polypeptides is modified by attachment of a vector.

212. (previously presented): A method of producing a polypeptide polymer comprising the steps of:

(a) providing a plurality of monomeric polypeptides and at least one divalent cation, wherein the monomer polypeptides are capable of self assembly in the presence of a divalent cation; and

(b) (i) polymerizing the monomeric polypeptides through a self assembly process in the presence of at least one divalent cation, or, (ii) polymerizing the monomeric polypeptides in the presence of a template molecule, under conditions wherein the monomeric polypeptides self assemble, thereby producing a polypeptide polymer,

wherein each monomeric polypeptide of the plurality of monomeric polypeptides have either (a) an amino acid sequence as set forth in SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, or SEQ ID NO:10, or, (b) an amino acid sequence as set forth in SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, or SEQ ID NO:10, having at least one conservative substitution,

and at least one monomeric polypeptide of the plurality of monomeric polypeptides is modified by attachment of an oligosaccharide.

213. (previously presented): A method of producing a polypeptide polymer comprising the steps of:

(a) providing a plurality of monomeric polypeptides and at least one divalent cation, wherein the monomer polypeptides are capable of self assembly in the presence of a divalent cation; and

(b) (i) polymerizing the monomeric polypeptides through a self assembly process in the presence of at least one divalent cation, or, (ii) polymerizing the monomeric polypeptides in the presence of a template molecule, under conditions wherein the monomeric polypeptides self assemble, thereby producing a polypeptide polymer,

wherein each monomeric polypeptide of the plurality of monomeric polypeptides have either (a) an amino acid sequence as set forth in SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, or SEQ ID NO:10, or, (b) an amino acid sequence as set forth in SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, or SEQ ID NO:10, having at least one conservative substitution,

and at least one monomeric polypeptide of the plurality of monomeric polypeptides includes a modification comprising attachment of an enzyme.

Claim 214 (currently amended): The method of claim 31, wherein an attached ~~a non-monomeric~~ polypeptide is attached to one monomeric protein.

Claim 215 (currently amended): The method of claim 31, wherein a plurality of polypeptides are ~~non-monomeric polypeptide is~~ attached to a plurality of the monomeric polypeptides ~~proteins~~.

Claim 216 (new): A method of producing a polypeptide polymer comprising the steps of:

(a) providing a plurality of monomeric polypeptides and at least one divalent cation or at least one template molecule, wherein the monomer polypeptides are capable of self assembly in the presence of a divalent cation or at least one template molecule,

wherein each monomeric polypeptide of the plurality of monomeric polypeptides have either (a) an amino acid sequence as set forth in SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, or SEQ ID NO:10, or, (b) an amino acid sequence as set forth in SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, or SEQ ID NO:10, and having at least one conservative substitution;

(b) (i) polymerizing the monomeric polypeptides through a self assembly process in the presence of the at least one divalent cation, or, (ii) polymerizing the monomeric polypeptides in the presence of the at least one template molecule, under conditions wherein the monomeric polypeptides self assemble, thereby producing a polypeptide polymer; and

(c) modifying at least one monomeric polypeptide in the produced polypeptide polymer by attaching a polypeptide, an oligosaccharide, a polynucleotide, a nucleotide or a nucleotide derivative, a lipid or a lipid derivative, an antibody, a Morphatide™, a vector or a targeting vector.

Claim 217 (new): The method of claim 216, wherein the polypeptide, oligosaccharide, polynucleotide, nucleotide or nucleotide derivative, lipid or lipid derivative, antibody, Morphatide™, vector or targeting vector is attached to at least one of the monomeric polypeptides.

Claim 218 (new): The method of claim 217, wherein a plurality of polypeptides, oligosaccharides, polynucleotides, nucleotides or nucleotide derivatives, lipids or lipid derivatives, antibodies, Morphatides™, vectors or targeting vectors are attached to a plurality of the monomeric polypeptides.

Claim 219 (new): The method of claim 216, wherein the conservative amino acid substitution comprises substituting one amino acid for another of the same class.

Claim 220 (new): The method of claim 219, wherein the conservative amino acid substitution comprises substitution of one hydrophobic amino acid for another, or substitution of one polar amino acid for another.

Claim 221 (new): The method of claim 190, wherein the conservative amino acid substitution comprises substitution of isoleucine, valine, leucine or methionine, for another hydrophobic amino acid.

Claim 222 (new): The method of claim 221, wherein the conservative amino acid substitution comprises substitution of arginine for lysine, glutamic acid for aspartic acid or glutamine for asparagine.

Claim 223 (new): The method of claim 216, wherein the polypeptide polymer is a nanoscale drug delivery vehicle.